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REMARKS ON

THE GENUS *ZERA* EVANS IN MEXICO

WITH A NEW RECORD

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FOUR SPECIES OF *ZERA* have been previously recorded from Mexico, and in most cases the data was very incomplete. Hoffmann lists three species from that country: *scybis* (Godman & Salvin), which is a synonym of *noelckeni* (Mabille); *peloepa* (Godman & Salvin), which is a synonym of *tetrastigma* (Sepp); and *hyacinthinus* (Mabille), which he said he had not seen in Mexico. Evans lists three species contained in the British Museum from Mexico: *noelckeni*, *hyacinthinus*, and *eboneus* (Bell). During the process of making a careful study of the HesperIIDae of Mexico I have found that there are actually five species of *Zera* in Mexico, one of which I am recording for the first time.

***Zera noelckeni* (Mabille) 1891**

Synonym.—*scybis* Godman & Salvin 1894: Atoyac, Veracruz, Mexico.

Type locality.—Bogota.

General distribution.—Mexico, Panama, Colombia, Venezuela, Ecuador (Loja, Ambato), Peru (Cuzco, Chanchamayo, Huanca-bamba), and Bolivia (Cochabamba, Tanampaya, San Jacinthe).

Mexican distribution.—Atoyac, Veracruz; Sierra Madre del Sur; Cuenca del Rio Balsas; and Colima.

Remarks.—This species was first recorded from Mexico by Godman & Salvin as *scybis* based on a specimen from Atoyac, Veracruz. Hoffmann listed several locations which are mentioned above. In the large number of specimens of HesperIIDae that Dr. Tarsicio Escalante, Mexico, D. F. sent me for determination there were no examples of this species. During the eighteen trips that I have made to Mexico I have not as yet turned up this species. From the available data *noelckeni* is apparently rare in Mexico as well as in some of the Central American areas.

¹I would like to express my thanks to the National Science Foundation for Research Grant GB-4122 which is making this study of the HesperIIDae of Mexico possible.

Zera hosta Evans 1953

Type locality. — Costa Rica.

General distribution. — Mexico, Costa Rica, and Colombia.

Mexican distribution. — Sta. Rosa, Comitan, Chiapas, 1 male May 1965.

Remarks. — Evans described *hosta* as a subspecies of *phila* (Godman & Salvin) based on the general difference of the secondaries on the lower surface, *hosta* being bluish-white over the discal one half to two thirds of the wing, and *phila* being entirely tawny, with some black spots. The general range of the two overlaps thus bringing up the question as to whether they are separate subspecies or species. For the present I will consider them to be specifically distinct.

New record for Mexico. — the above mentioned male, which was obtained from Dr. Escalante, is the first record of this species from Mexico.

Zera hyacinthinus (Mabille) 1877

Type locality. — ?

General distribution. — Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, and Colombia.

Mexican distribution. — Presidio, Veracruz, 1 male, August 1951 (A. Ramirez); Ajijic, Jalisco, 1 male, 27 September 1965, and 1 male, 5 October 1965 (Robert Wind); and 2 males and 1 female, Oaxaca, Oaxaca, 22 June 1966 (H. A. Freeman).

Remarks. — Considerable confusion has centered around this species for many years. Godman & Salvin figured the male and genitalia of *tetrastigma* as *hyacinthinus*. Hoffmann stated that he had not seen any examples from Mexico indicating that possibly he was not familiar with the exact status of the species. Evans recorded four males and three females from Mexico with no other data. I have in my collection the above mentioned specimens listed under Mexican distribution of this species from Mexico. From the available data indications are that this species of *Zera* is the predominant one in Mexico.

Zera tetrastigma (Sepp) 1848

Synonyms. — *menedemus* Godman & Salvin 1894: Panama; *peloepa* Godman & Salvin 1894: Amazons.

Type locality. — Surinam.

General distribution. — Mexico, Guatemala, Nicaragua, Panama, Colombia, Trinidad, British Guiana, French Guiana, Peru (Chanchamayo, Chaquimayo), Bolivia (Buenavista), Upper Amazons (Iquitos, Tonantins, S. Paulo de Olivenca), and Para.

Mexican distribution. — Sierra Madre Occidental (Nayarit);

Catemaco, Veracruz, one male, November 1964, and one female, January 1952 (A. Ramirez). Specimens obtained from Dr. Escalante.

Remarks. — The considerable variation of this species has resulted in two synonyms: *menedemus*, having the secondaries below with the dorsal half white; and *pelopea*, having the secondaries below entirely dark brown, with bands absent or vestigial. Typical *tetrastigma* is dark brown on the secondaries below with well-marked black central and submarginal bands, and some bluish-white over the dorsal half of the wing.

Zera eboneus (Bell) 1947

Type locality. — Ojo de Agua, Veracruz, Mexico.

General distribution. — Mexico.

Mexican distribution. — Ojo de Agua, Veracruz, 12 June 1941.

Remarks. — From Bell's original description and genitalia figure *eboneus* is apparently a distinct species. Evans states that the genitalia are similar to those of *belti* (Godman & Salvin), and that *eboneus* is probably an aberration or subspecies of *belti*. However as he never examined the type it seems most unlikely that the two are the same species since they are so different superficially.

Key to the Mexican species of *Zera*

- 1a. Primaries above with dark central area2
- 1b. Primaries above plain black5
- 2a. Primaries above with dark central area extending to base and lower end of cell; three apical spots3
- 2b. Primaries above with dark central area not extending to base, which is broadly violaceous, nor to end of cell; 1-3 apical spots4
- 3a. Primaries above with dark bar at end of cell; secondaries below with dorsal half bluish-white, but tawny colouring from costa runs narrowly along outer margin to vein 1b*nolckeni* (Mab.)
- 3b. Primaries above with no dark bar at end of cell; secondaries below with dorsal one half to two thirds bluish-white*hosta* Evans
- 4a. Primaries with tornus truncate and dorsum slightly concave; primaries below with tornal area broadly tawny, often reaching the costa and unmarked except for an inconspicuous discal spot; usually 3 apical spots*hyacinthinus* (Mab.)
- 4b. Primaries not truncate at tornus and dorsum more or less straight; primaries below with tornal tawny area restricted and marked with a large dark central spot; usually only one apical spot*tetrastigma* (Sepp)
5. Primaries below brown, with faint spot in space 8; secondaries below with pale bar at end of cell*eboneus* Δ Bell \square

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- GODMAN, FREDERICK DUCANE, and OSBERT SALVIN. 1887-1901. *Biologia centrali-Americana. Insecta. Lepidoptera-Rhopalocera*, II, 244-637; LII: pls. 112.
- HOFFMANN, C. C. 1941. Catalogo sistematico y zoogeografico de los Lepidopteros Mexicanos. Segunda parte-Hesperioidea. *An. Inst. Biol. Mexico*. 12: 237-294.

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STUDIES ON THE NEARCTIC *EUCHLOE*

Part 3. COMPLETE SYNONYMICAL TREATMENT

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FULL SYNONYMIES ARE PRESENTED here for *Euchloe ausonides*, *Euchloe creusa*, *Euchloe hyantis*, and their named subspecific segregates. The author believed completeness to be essential so that future workers may refer to the material contained in past literature citations in light of the interpretations of these treatments.

Synonymical treatments for *Euchloe olympia* and *E. olympia rosa* are not presented at this time.

***Euchloe (Euchloe) ausonides* (Lucas)**

Anthocharis ausonides Lucas, 1852, Rev. Zool., 4(2nd ser.): 340; Boisduval, 1852, Ann. Soc. Ent. Fr., 2:X:286; Reakirt [*partim.*], 1866, Proc. Ent. Soc. Phil., 6:135; Herrich-Schaffer, 1867, Corr.-Blatt. Zool. Min. Ver. Regnsb., 21: 144; Boisduval, 1869, Ann. Soc. Ent. Belg., 12:40; Mead [*partim.*], 1875, in Wheeler, Rept. Geogr. Expl., 5:747; Moschler, 1878, Stett. Ent. Zeit., 39: 299, 309; Edwards, 1884, Trans. Amer. Ent. Soc., 9:261; Smith, 1891, List Lepid. Bor. Amer., p.13; Skinner [*partim.*] [erroneously includes the name *coloradensis* as a synonym], 1898, Syn. Cat. N. Amer. Rhop., p. 64; Grote, 1900, Proc. Am. Phil. Soc., 39:40; Skinner, 1903, in Smith, Chklst. Lepid. Bor. Amera., p. 9; Franck, 1905, Ent. News 16:28.

Anthocharis ausonides [*lapsus calami*]: Edwards [*partim.*], 1863, Proc. Ent. Soc. Phil., 2:81; Weidemeyer, 1863, Proc. Ent. Soc. Phil., 2:151; Edwards [*partim.*], 1897, Butt. N. Amer., 3:412.

Euchloe ausonides: Kirby, 1871, Syn. Cat. Di. Lepid., p. 340; Beutenmuller, 1898, Bull. Amer. Mus. Nat. Hist., 10:240-241, pl. 14, fig. 1; Holland [*partim.*], 1898, Butt. Book, p. 283, pl. 32, figs. 24, 25, pl. 34, fig. 3; Butler [*partim.*], 1899, Can. Ent., 31:19; Wright [*partim.*], 1906, Butt. West Coast, p. 104, figs. 56, 56b, 56c; Coolidge [*partim.*], [erroneously includes the name *coloradensis* as a synonym], 1908, Can. Ent., 40:298; Coolidge & Newcomes, 1908, Ent. News 19:204; Rober [*partim.*], 1909, in Seitz, Macrolepid., World 5:95, pl. 28, fig. a'; Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3: 61-62; Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25:7; Comstock [*partim.*], 1927, Butt. Calif., p. 37, pl. 10, figs. 6, 9; Holland, 1931, Butt. Book, p. 284, pl. 32, figs. 24, 25, pl. 34, fig 3; Martin & Ingham, 1931, Bull. So. Calif. Acad. Sci., 29: ; Davenport & Dethier, 1937, Ent. Amer. 17: 179; McDunnough [*partim.*], 1938, Mem. So.

- Calif. Acad. Sci., 1:7; Leighton [*partim.*], 1946, Univ. Wash. Pub. Biol., 9: ; Martin & Truxal, 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5; Bird, 1956, Lepid. News 10:107; Ehrlich & Ehrlich [*partim.*], 1961, How to know Butt., p. 75, fig. ; Ehrlich & Ehrlich, 1962, Microent., 25(1):4.
- Anthocharis ausonia* var. *ausonoides* [*lapsus calami*]: Strecker, 1878, Syn. Cat. Macrolep., p. 77.
- Anthocrais ausonoides* [*lapsus calami*]: Hy. Edwards, 1880, Pacific Coast Lepid., 22; Hy Edwards, 1881, Papilio 1:51; von Osten-Sacken, 1882, Papilio 2: 29.
- Anthocharis ausonoides*: Geddes, 1883, Can. Ent., 15:221.
- Euchloe* "variety from Vancouver", Butler [*partim.*], 1899, Can. Ent., 31:19.
- Synchloe ausonoides*: Dyar, 1902, Bull. U.S. Nat. Mus., 52:7; Anderson, 1904, Cat. Brit. Col. Lepid., p. 6.
- Synchloe ausonoides* [*lapsus calami*]: Elrod & Maley [*partim.*], 1906, Bull. Univ. Montana 30 (Biol.): 32.
- Synchloe ausonoides*: Elrod & Maley [*partim.*], 1906, Bull. Univ. Montana 30 (Biol.): 32.
- Euchloe creusa* (non Doubleday): Wright [*partim.*], 1906, Butt. West Coast, fig. 54b.
- Euchloe rosa* (non Edwards): Wright [*partim.*], 1906, Butt. West Coast, fig. 54c.
- Euchloe coloradensis* (non Hy. Edwards): Coolidge, 1908, Can. Ent., 40:299 (synonymy); Storer & Usinger, 1963, Sierra Nevada Nat. Hist., Univ. Calif. Press, p. 195.
- Euchloe belia* var. *creusa* (non Doubleday): Verity [*partim.*], 1908, Rhop. Pal., pl. 37, fig. 19.
- Euchloe belia* var. *creusa* gen. aest. *ausonoides*: Verity [*partim.*], 1908, Rhop. Pal., pl. 37, fig. 20 [type], figs. 21, 22, 23, 24 .
- Euchloe ausonoides* ♀ var. *flavidalis* Comstock [*partim.*], 1924, Bull. So. Calif. Acad. Sci., 23: 5; Comstock [*partim.*], 1927, Butt. Calif., p. 37, pl. 10, fig. 10 [TYPE].
- Euchloe ausonoides* var. *semiflava* Comstock [*partim.*], 1924, Bull. So. Calif. p 37, pl. 10, fig. 11 [TYPE].
- Euchloe ausonoides* ab. *semiflava*: Barnes & Benjamin [*partim.*]. 1926, Bull. So. Calif. Acad. Sci., 25: 7; McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1(1): 7; Leighton [*partim.*], 1946, Univ. Wash. Pub. Biol., 9: ; dos Passos [*partim.*], 1964, Lepid. Soc. Mem., 1:49.
- Euchloe ausonoides* ab. *flavidalis*: Barnes & Benjamin [*partim.*], 1926, Bull. So. Calif. Acad. Sci., 25: 7; McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1(1): 7.
- Euchloe ausonoides coloradensis* (non Hy. Edwards): Comstock [*partim.*], 1927, Butt. Calif., p. 38; Brooks, 1942, Can. Ent., 74: 31; Martin & Truxal [*partim.*], 1955, Los Angeles Co. Mus. Sci. Ser., 18 (Zool.): 8:5; Garth & Tilden [*partim.*], 1963, J. Res. Lepid., 2:50.
- Euchloe ausonoides* ab. *boharti* Doudoroff, 1930, Pan-Pac. Ent., 6: 143; McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1(1): 7; dos Passos [*partim.*], 1964, Lepid. Soc. Mem., 1:49.
- Euchloe ausonoides ausonoides*: Talbot, 1932, Lepid. Catalogus 53:301; dos Passos [*partim.*], 1964, Lepid. Soc. Mem., 1:49.
- Euchloe ausonoides* race *coloradensis* tr. f. [sic] *hemiflava* Field, 1936, J. Ent. & Zool., 28:19.
- Euchloe ausonoides coloradensis* ab. *hemiflava*: McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1(1): 7; Martin & Truxal [*partim.*], 1955, Los Angeles Co. Mus. Sci. Ser., 18 (Zool.), 8:5; dos Passos [*partim.*], 1964, Lepid. Soc. Mem., 1:49.
- Euchloe creusa orientalides* (non Verity): Martin & Truxal, 1955, Los Angeles Co. Mus. Sci. Ser., 18 (Zool.) 8:5.

Euchloe creusa lotta (non Beutenmuller): Garth & Tilden [*partim.*], 1963, J. Res. Lepid., pl. 58, fig. 1.

***Euchloe* (*Euchloe*) *ausonides coloradensis* (Hy. Edwards)**

Anthocharis ausonides [*lapsus calami*]: Edwards [*partim.*], 1863, Proc. Ent. Soc. Phil., 2:78; Edwards [*partim.*], 1897, Butt. N. Amer., 3:412.

Anthocharis ausonides: Reakirt [*partim.*], 1886, Proc. Ent. Soc. Phil., 6:135; Mead [*partim.*], 1875, in Wheeler, Rept. Geogr. Expl., 5:747; Mead, 1877, Psyche 2:182; Skinner, 1902, Trans. Amer. Ent. Soc., 29:37.

Anthocharis coloradensis Hy. Edwards 1881, Papilio 1:50.

Anthocharis ausonides coloradensis: Edwards, 1884, Trans. Amer. Ent. Soc., 9:261; Smith, 1891, List Lepid. Bor. Amer., p. 13; Skinner, 1903, Chklst. Lepid. Bor. Amer., p. 9.

Anthocharis ausonides var. *coloradensis*: Cockerell, 1899, Ent. Amer., 5:33.

Euchloe ausonides var. *coloradensis*: Beutenmuller [*partim.*], 1898, Bull. Amer. Mus. Nat. Hist., 10:241.

Euchloe coloradensis: Butler, 1899, Can. Ent., 31:19.

Synchloe ausonides coloradensis: Dyar, 1902, Bull. U.S. Nat. Mus., 52:7.

Euchloe ausonides coloradensis: Wright, 1906, Butt. West Coast p. 104; Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:61; Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25:7; Comstock [*partim.*], 1927, Butt. Calif., pl. 10, figs. 13, 14; Klots, 1930, Bull. Brook. Ent. Soc., 25:154; Holland, 1931, Butt. Book p. 284; Talbot, 1932, Lepid. Catalogus 53:302; Cross, 1937, Proc. Colo. Mus. Nat. Hist., 16:7; McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1(1):7; Brown, 1955, Proc. Denver Mus. Nat. Hist., 6:181; Martin & Truxal [*partim.*], Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5; Defoliart, 1956, Lepid. News 10:99; dos Passos [*partim.*] [erroneously includes the name *hemiflava* as a synonym], 1964, Lepid. Soc. Mem., 1:49.

Euchloe belia var. *belioides* race *montana* Verity, 1908, Rhop. Pal., pl. 68, figs. 13, 14, 15.

Euchloe ausonides montana: Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3 [synonymy]; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25:7 [synonymy]; Holland, 1931, Butt. Book p. 284 [synonymy]; McDunnough, 1938, Mem. So. Calif. Acad. Sci., 1(1):7 [synonymy]; dos Passos, 1964, Lepid. Soc. Mem., 1:49 [synonymy].

Euchloe ausonides coloradensis ab. *hemiflava* (non Field): Martin & Truxal [*partim.*], 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5.

Euchloe ausonides (non Lucas): Maeki & Remington, 1960, J. Lepid. Soc., 14: 42, 52; Ehrlich & Ehrlich [*partim.*], 1961, How to Know Butt., p. 75; Ehrlich, 1961 Microent., 24(4):138.

Euchloe ausonides race *mayi* Chermock & Chermock, 1940, Can. Ent., 72:82.

***Euchloe* (*Euchloe*) *ausonides mayi* Chermock & Chermock**

Euchloe ausonides mayi: Brooks, 1942, Can. Ent., 74:32; dos Passos, 1964, Lepid. Soc. Mem., 1:49.

Anthocharis creusa Doubleday, 1847, Gen. Di. Lepid., 1:56, pl. 7, fig. 1; Weidemeyer, 1863, Proc. Ent. Soc., Phil., 2:151; Herrich-Schaffer, 1867, Corr.-Blatt. Zool. Min. Ver. Regnsb., 21:144; Smith, 1891, List Lepid. Bor. Amer., p. 13; Skinner, 1898, Syn. Cat. N. Amer. Rhop., p. 64; Skinner, 1903, in Smith, Chk. Lst. Lepid. Bor. Amer., p. 9.

Euchloe creusa: Kirby, 1871, Syn. Cat. Di. Lepid., p. 340; Beutenmuller, 1897, J. N.Y. Ent. Soc., 5:208; Beutenmuller [*partim.*], 1898, Bull. Amer. Mus. Nat. Hist., 10:16; Butler, 1899, Can. Ent., 31:56; Coolidge, 1908, Can. Ent., 40:299; [?] Rober, 1909, in Seitz, Macrolepid. World 5:95, pl. 28, fig. a"; Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:59; Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin [*partim.*] [authors erroneously

include the name *pumilio* as a synonym], 1926, Bull. So. Calif. Acad. Sci., 25:7; McDunnough [*partim.*] [erroneously includes the name *pumilio* as a synonym], 1938, Mem. So. Calif. Acad. Sci., 1:17; Martin & Truxal, 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5; Ehrlich & Ehrlich [*partim.*] [authors erroneously include Alberta in statement of distribution], 1961, How to Know Butt., p. 75; dos Passos [*partim.*] [incorrectly includes the name *pumilio* as a synonym], 1964, Lepid. Soc. Mem., 1:49.

Anthocaris creusa [*lapsus calami*]: Edwards, 1881, Papilio 1:51.

Euchloe creusa var. *elsa* Beutenmuller [*partim.*], 1898, Bull. Amer. Mus. Nat. Hist., 10:342, pl. 14, fig. 3; Beutenmuller [*partim.*], 1899, Can. Ent., 31:56.

Euchloe elsa: Butler, 1899, Can. Ent., 31:19 [synonymy]; Coolidge, 1898, Can. Ent., 40:299 [synonymy]; Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:59 [synonymy]; Barnes & McDunnough, 1917, Chkfst. Lepid. Bor. Amer., p. 3 [synonymy]; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25:7 [synonymy]; Holland [*partim.*], 1931, Butt. Book p. 285 [synonymy]; McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1:7 [synonymy]; dos Passos [*partim.*], 1964, Lepid. Soc. Mem., 1:49 [synonymy].

Synchloe creusa: 1904, Anderson, Cat. Brit. Col. Lepid., p. 6.

Euchloe belia var. *orientalides* Verity [*partim.*], 1908, Rhop. Pal., pl. 36, fig. 58.

Euchloe belia var. *creusa* Verity [*partim.*], 1908, Rhop. Pal., pl. 68, figs. 11, 13 ("COTYPES") [As mentioned in Barnes & McDunnough, 1916, verified through correspondence with Dr. N. D. Riley of the British Museum, 1964, these two figures represent the dorsal and ventral surfaces of the single type specimen].

Euchloe creusa orientalides: Barnes & McDunnough [*partim.*], 1917, Chkfst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin [*partim.*], 1926, Bull. So. Calif. Acad. Sci., 25:7; McDunnough [*partim.*], 1938, Mem. So. Calif. Acad. Sci., 1:7; dos Passos [*partim.*], 1964, Lepid. Soc. Mem., 1:49.

Euchloe (*Euchloe*) *creusa*: Klots, 1930, Bull. Brook. Ent. Soc., 25:87.

Euchloe creusa creusa: Talbot [*partim.*], 1932, Lepid. Catalogus 53:302.

Euchloe creusa creusa ab. *elsa*: Talbot [*partim.*], 1932, Lepid. Catalogus 53:302.

***Euchloe* (*Euchloe*) *hyantis hyantis* (Edwards)**

Anthocharis hyantis Edwards, 1871, Trans. Amer. Ent. Soc., 3:205; Mead, 1877, Psyche, 2:182; Butler [*partim.*], 1882, J. Linn. Soc., 16:471; Edwards [*partim.*], 1884, Trans. Amer. Ent. Soc., 9:260; Smith, 1891, List Lepid. Bor. Amer., p. 13; Edwards, 1892, Can. Ent., 24:109; Skinner, 1903, in Smith, Chkfst. Lepid. Bor. Amer., p. 9.

Anthocaris hyantis: Hy. Edwards [*partim.*] [erroneously treats the name *creusa* as a synonym], 1880, Pac. Coast Lepid., 22; Hy. Edwards, 1880, Pac. Coast Lepid., 28; Edwards, 1881, Papilio 1:51; von Osten Sacken, 1882, Papilio, 2:29.

Anthocaris creusa: Hy. Edwards, 1880, Pac. Coast Lepid., no. 22 [synonymy].

Euchloe hyantis: Butler [*partim.*], 1882, J. Linn. Soc., 16:471; Beutenmuller, 1897, J. N.Y. Ent. Soc., 5:208; Butler, 1899, Can. Ent., 31:19; Beutenmuller, 1899, Can. Ent., 31:56; Coolidge [*partim.*], 1908, Can. Ent., 40:298; [?] Rober, 1909, in Seitz, Macrolepid. World pl. 28, fig. a"; Holland [*partim.*], 1931, Butt. Book, rev. ed., pl. 67, fig. 27 ["TYPE"]; Storer & Usinger, 1963, Sierra Nevada Nat. Hist., pl. 67, fig. 72.

Euchloe creusa: Beutenmuller [*partim.*], 1898, Bull. Amer. Mus. Nat. Hist., 10:241, pl. 14, fig. 2.

- Anthocharis ausonides* var. *hyantis*: Skinner, 1898, Syn. Cat. N. Amer. Rhop., p. 64.
- Anthocharis ausonides hyantis*: Franck, 1905, Ent. News, 16:28 [synonymy].
- Anthocharis ausonides coloradensis*: Franck, 1905, Ent. News, 16:29 [synonymy].
- Euchloe creusa* var. *hyantis*: Coolidge [partim.], 1908, Can. Ent., 40:298.
- Euchloe belia* var. *creusa* (non Doubleday): Verity, 1908, Rhop. Pal., pl. 37, fig. 16.
- Euchloe creusa* cum. ab. [sic] *pumilio* Strand [partim.], 1914, Archiv. f. Naturgesch., 80(A 11):153.
- Euchloe creusa hyantis*: Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:60; Barnes & McDunnough [partim.], 1917, Chklst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin [partim.], 1926, Bull. So. Calif. Acad. Sci., 25:7; Comstock [partim.], 1927, Butt. Calif., p. 38; Talbot, 1932, Lepid. Catalogus 53:302; McDunnough [partim.], 1938, Mem. So. Calif. Acad. Sci., 1:7; Martin & Truxal [partim.], 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5; Garth & Tilden, 1963, J. Res. Lepid., 2:50, 87; dos Passos [partim.], 1964, Lepid. Soc. Mem., 1:49.
- Euchloe creusa pseudoausonides*: Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:61 [synonymy]; Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3 [synonymy]; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25: [synonymy]; McDunnough, 1938, Mem. So. Calif. Acad. Sci., 1:7 [synonymy]; dos Passos, 1964, Lepid. Soc. Mem., 1:49 [synonymy].
- Euchloe creusa orientalides*: Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:61 [synonymy]; Barnes & McDunnough [partim.], 1917, Chklst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin [partim.], 1926, Bull. So. Calif. Acad. Sci., 25:7; McDunnough [partim.] 1938, Mem. So. Calif. Acad. Sci., 1:7; dos Passos [partim.], 1964, Lepid. Soc. Mem., 1:49.
- Euchloe ausonides andrewsi* (non Martin): Powell, 1958, Lepid. News, 12:28.

***Euchloe* (*Euchloe*) *hyantis andrewsi* (Martin) NEW COMBINATION**

- Euchloe ausonides* race *andrewsi* Martin, 1936, Bull. So. Calif. Acad. Sci., 35:94.
- Euchloe ausonides andrewsi*: Martin & Truxal, 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5; dos Passos, 1964, Lepid. Soc. Mem., 1:49.

***Euchloe* (*Euchloe*) *hyantis lotta* (Beutenmuller), NEW COMBINATION**

- Anthocharis creusa* (non Doubleday): Strecker, 1878, Syn. Cat. Macrolepid., p. 77.
- Anthocharis hyantis* (non Edwards): Morrison, 1883, Papilio 3:9; Edwards [partim.], 1884, Trans. Amer. Ent. Soc., 9:260.
- Euchloe lotta* Beutenmuller, 1898, Bull. Amer. Mus. Nat. Hist., 10:24, pl. 14, fig. 4; Butler, 1899, Can. Ent., 31:56; Wright [partim.], 1906, Butt. West Coast, p. 104; Holland [partim.], 1931, Butt. Book, rev. ed., p. 285, pl. 73, fig. 5 ["TYPICAL", text], ["PARATYPE", plate legend].
- Euchloe creusa* (non Doubleday): Holland [partim.], 1898, Butt. Book, p. 283, pl. 32, fig. 23, pl. 34, fig. 2; Wright [partim.], 1906, Butt. West Coast, p. 194, figs. 54, 54a; Klots, 1930, Bull. Brook. Ent. Soc., 25: 153; Holland [partim.], 1931, Butt. Book, rev. ed., pl. 32, fig. 23, pl. 34, fig. 2; Leighton [partim.], 1946, Univ. Wash. Pub. Biol., 9: ; Bauer, 1953, Lepid. News 7:146; Brown, 1955, Proc. Denver Mus. Nat. Hist., 6:182; Ehrlich & Ehrlich [partim.], 1961, How to Know Butt., p. 75, fig.
- Euchloe ausonides* var. *lotta*: Browning, 1901, Ent. News, 12(10):301, fig. 5.

- Synchlœ creusa* (non Doubleday): Dyar [*partim.*], 1902, Bull. U.S. Nat. Mus., 52:7.
- Synchlœ lotta*: Dyar [*partim.*], 1902, Bull. U.S. Nat. Mus. 52:7.
- Anthocharis lotta*: Skinner, 1903, in Smith, Chklst. Lepid. Bor. Amer., p. 9.
- Euchlœ hyantis* (non Edwards): Wright [*partim.*], 1906, Butt. West Coast, p. 104; Strand [*partim.*], 1914, Archiv. f. Naturgesch., 80(A 11):153; Holland [*partim.*], 1931, Butt. Book, rev. ed., p. 285.
- Euchlœ rosa* (non Edwards): Wright [*partim.*], 1906, Butt. West Coast, p. 104, figs. 56, 56b.
- Euchlœ belia* var. *orientalides* Verity [*partim.*], 1908, Rhop. Pal., pl. 36, fig. 58.
- Euchlœ creusa* var. *lotta*: Coolidge, 1908, Can. Ent., 40:299.
- Euchlœ belia* var. *creusa* (non Doubleday): Verity [*partim.*], 1908, Rhop. Pal., pl. 37, figs. 17, 18.
- Euchlœ creusa* cum. ab. [*sic!*] *pumilio* Strand [*partim.*], 1914, Archiv. f. Naturgesch., 80(A 11):153.
- Euchlœ creusa lotta*: Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:61; Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25:7; Comstock [*partim.*], 1927, Butt. Calif., p. 38, pl. 10, figs. 7, 8; Gunder, 1930, Bull. So. Calif. Acad. Sci., 29:9; Comstock & Dammers, 1932, Bull. So. Calif. Acad. Sci., 31:35; Talbot, 1932, Lepid. Catalogus 53:302; Davenport & Dethier [*partim.*], 1937, Ent. Americana 17:179; McDunnough, 1938, Mem. So. Calif. Acad. Sci., 1(1):7; Martin & Truxal [*partim.*], 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5; Garth & Tilden [*partim.*], 1963, J. Res. Lepid., pl. 5, fig. N; dos Passos, 1964, Lepid. Soc. em., 1:49.
- Euchlœ belioides*: Barnes & McDunnough, 1916, Contr. Nat. Hist. Lepid. N. Amer., 3:61 [synonymy]; Barnes & McDunnough, 1917, Chklst. Lepid. Bor. Amer., p. 3 [synonymy]; Barnes & Benjamin, 1926, Bull. So. Calif. Acad. Sci., 25:7 [synonymy]; Holland, 1931, Butt. Book, rev. ed., p. 285 [synonymy]; McDunnough, 1938, Mem. So. Calif. Acad. Sci., 1(1):7 [synonymy]; dos Passos, 1964, Lepid. Soc. Mem., 1:49 [synonymy].
- Euchlœ creusa hyantis* (non Edwards): Coolidge, 1925, Ent. News, 36:65; Comstock [*partim.*], 1927, Butt. Calif., p. 38, pl. 10, figs. 4, 5; Davenport & Dethier [*partim.*], 1937, Ent. Americana 17:179; Leighton [*partim.*], 1946, Univ. Wash. Pub. Biol., 9: ; Martin & Truxal [*partim.*], 1955, Los Angeles Co. Mus. Sci. Ser., 18(Zool.), 8:5.
- Euchlœ creusa* ab. *pumilio*: Strand, 1927, Bull. Soc. Zool. France 51:412.

STUDIES ON THE NEARCTIC *EUCHLOE*

Part 4. TYPE DATA AND TYPE LOCALITY RESTRICTIONS¹

IN ANY TAXONOMIC REVISION, it is important for the revisor to know the biological identity and the type locality of the insect with which he is dealing. As a direct result of this precept, the information concerning the types of the named entities of Nearctic *Euchlœ*, which are considered to be biologically applicable by this author, is presented in this paper. Also, the type localities

¹ F. M. Brown, Colorado Springs, Colorado and J. A. Powell, University of California, Berkeley, California kindly read the manuscript of this paper and offered several helpful suggestions.

of three named taxa are restricted so as to provide a base for logical discussion of the distributional limits and the geographic variability of these units and their associated populations.

For each name, the citation of the original description, a compendium of the available information concerning the type, and an interpretation of the type information are presented.

Euchloe (Euchloe) ausonides (Lucas)

CITATION OF ORIGINAL DESCRIPTIONS Lucas, 1852. *Rev. Mag. Zool.* 4(2nd series):324-345.

TYPE DATA: The holotype is in the collection of the United States National Museum, Washington, D.C. The specimen is *ex* collection Barnes, *ex* collection Oberthur, and *ex* collection Boisduval. Dr. Jerry A. Powell of the University of California at Berkeley examined the type specimen and obtained the data which are presented below.

The specimen, which lacks the right forewing and both antennae, has a forewing costal measurement [base to apex] of 24.3 millimeters. The forewing discal spot is 1.2 millimeters in width at the middle and has fairly heavy whitish overscaling along the vein at the upper edge of the cell.

The specimen bears five labels as follows: 1./"Ex Musaeo Dris Boisduval" machine printed label with black border, 2./"Oberthur Collection" machine printed label with red border, 3./"Figure par R. Verity/Rhopal. Palaeartica Pl XXXVII, fig. 20", 4./"Anthocharis Ausonides, Boisd., Lepid. Californie, II Partie, St. Entom. Belq. 1869 p. 40" handwritten label, 5./"Type *ausonides* Bdv. a/c Hofer 1925FHB" handwritten label with red border, different hand than 4.

INTERPRETATION OF TYPE DATA: That this is the type specimen described by Lucas is substantiated by the fact that the costal measurement of this unusually large male specimen is in close agreement with the measurement given by Lucas (1852).

The specimen was part of the first lot of material sent to Boisduval by P. J. M. Lorquin who collected the material for that shipment in central California. Since Lucas, as well as Boisduval, stated nothing further than "California" as the type locality, since there are populations of this species occurring in California with significantly varying phenotypic expression, and since Lorquin could well have collected the specimen in the San Francisco Bay area, the type locality is hereby restricted to San Francisco, San Francisco County, California.

Euchloe (Euchloe) ausonides coloradensis (Hy, Edwards)

CITATION OF ORIGINAL DESCRIPTION: Hy, Edwards, 1881. *Papilio* 1(4):50-55.

TYPE DATA: The holotype is in the American Museum of Natural History, New York. The specimen bears the following labels: 1./AMNH catalogue number "3577" on which the word "Colorado" is appended, 2./The original Henry Edwards label bears the catalogue number "14".

INTERPRETATION OF TYPE DATA: The following information was supplied by F. M. Brown (personal communication). In his catalogue under entry "14", Henry Edwards noted, "*ausonides* Bdv. pastures Alameda Co. Calif. etc. HE 3-5, settles on flowers of *Sinapis* [= *Brassica*]." Brown states that the "14" on the type specimen means that Henry Edwards at first considered the specimen to be the same as the material he collected in California from March through May. Brown, who examined the type specimen at the request of the author, sent the accompanying analysis which is quoted in part below.

The specimen is without doubt one sent to Henry Edwards by W. H. Edwards from the material collected by T. L. Mead in 1871. In a letter from W.H.E. to Hy. E. dated July 8, 1871 about Mead specimens being sent to Hy. Edw., Edwards states 'And *Anthocaris* 1 is *Ausonides*. The *Anthocaris* 2 is new if it is not *Reakirtii*.' The date of the letter places the capture in June. Mead (1875: 747-748) confirms this.

From the itinerary of Mead pieced together by Brown (1955), it is seen that in June, 1871, Mead traveled from Denver to Fairplay *via* Morrison, Turkey Creek Junction, Bailey, and Kenosha House, whereupon he returned to Turkey Creek Junction by the same route. He then remained at Turkey Creek for a week (June 20-27, 1871) before moving elsewhere. Coolidge and Newcomer (1908) quote from a letter written by Mead to W. H. Edwards in which Mead told about finding the eggs and larvae of *Euchloe ausonides coloradensis* at Turkey Creek Junction. From the information supplied by Brown, including a suggestion that Turkey Creek Junction would be a good type locality, and the fact that it is known that Mead found eggs and larvae of *Euchloe ausonides coloradensis* at Turkey Creek Junction, the type locality of *Euchloe ausonides coloradensis* is hereby restricted to Turkey Creek Junction, Jefferson County, Colorado.

***Euchloe (Euchloe) creusa creusa* (Doubleday)**

CITATION OF ORIGINAL DESCRIPTIONS Doubleday, 1847. *Gen. Di. Lepid.* 1:56, pl. 7, fig. 1.

TYPE DATA: The original citation stated only that the type was collected in the Rocky Mountains of North America, there was no description, and the plate figure is a barely recognizable draw-

ing. N. D. Riley of the British Museum of Natural History, in whose institution the holotype specimen is located, supplied the author with the necessary information concerning the type. The specimen bears two labels: 1./"Rocky Mountains 45-135", 2./"Rhopalocera Palaearctica".

INTERPRETATION OF TYPE DATA: Riley (personal communication) states that the first label which was mentioned above indicates that the specimen was presented in 1845 by the then Earl of Derby. F. M. Brown (personal communication) states that "the great majority of North American specimens collected by Lord Derby came from the vicinity of Banff, Alberta. I doubt that he got over to the B.C. side of the range and it is questionable that he got as far north as Kicking Horse Pass." The second label shows that the specimen was figured by Verity (1908); the dorsal and the ventral surfaces of the type specimen are shown as figures 11 and 12 on plate 68. Taking into consideration the previously stated judgements of Brown, as well as those of Barnes and McDunnough (1916) and McHenry (personal communication), and the fact that specimens readily assignable to the holotype have been collected near Banff, the type locality of *Euchloe creusa* Doubleday is hereby restricted to the vicinity of Banff, near 7,000' elevation, Alberta, Canada.

***Euchloe (Euchloe) hyantis hyantis* (Edwards)**

CITATION OF ORIGINAL DESCRIPTION: Edwards, 1871 *Trans. Amer. Ent. Soc.* 3:205-216.

TYPE DATA: In the original citation it was stated that the type material was collected at Mendocino, California by R. H. Stretch. Specimens designated as types are located in the collection of the Carnegie Museum, Pittsburgh, Pennsylvania. H. K. Clench (personal communication) states that there is a specimen labeled as follows: "*Hyantis* ♀ / type Cala" written in the hand of W. H. Edwards, the word "type" in red, the rest in black. A pin with an identical label except ♂ with a fragment of thorax on it is next to the supposed allotype.

INTERPRETATION OF TYPE DATA: "Mendocino, California" is now known as Mendocino City, Mendocino County, California. The significance of the red and the black ink on the type labels pertains to the context of the time when they were written. According to F. M. Brown the notations in black were probably written in 1889 or sometime later when Edwards shipped the specimens to Holland. The story of the word "type" written in red ink, according to Clench (personal communication), is that after Holland had purchased Edwards' collection he removed the labels from the specimens that he considered to be types and

returned them to Edwards, who wrote the word "type" on them in red ink. He subsequently returned them to Holland who replaced the labels on the appropriate specimens. It should also be noted that the original description stated "In the collection of Hy. Edwards". Although this collection is under the care of the American Museum of Natural History, specimens designated as types of *hyantis* are not to be found in that institution. The above situation cannot be resolved at this time and a final decision of the proper types of *hyantis* must be held in abeyance.

Euchloe (Euchloe) *hyantis lotta* Beutenmuller

CITATION OF ORIGINAL DESCRIPTION: Beutenmüller, 1898. *Bull. Amer. Mus. Nat. Hist.* 10(13):243, pl. 14, fig. 4.

TYPE DATA: Neither a type specimen nor a type locality was designated in the original paper. The distribution which was given as "Colorado, Arizona, Utah, Southern California", and a drawing are sufficient to delineate, in the gross sense, the entity to which this name should apply. There is a specimen figured by Holland (1931) as figure 5 on plate 73 which is referred to by him in the text as "paratype" and on the plate legend as "typical". The specimen is in the Carnegie Museum and bears the following labels: 1./"P.----- ♂, Arizona" (in pen, possibly in the hand of W. H. Edwards), 2./"lotta" (typewritten), 3./"Butterfly Book, Plate 73 Fig. 5" (the underlined numerals written in pen) (Clench, personal communication).

INTERPRETATION OF TYPE DATA: The problem now arises whether the above specimen is a syntype loaned by Beutenmüller to Holland for illustration in his book as was done with "*Thecla ilavia*" Beutenmüller (P. McHenry, personal communication), or if the specimen was selected by Holland from the W. H. Edwards material and was never seen by Beutenmüller. If the latter case were true the specimen is NOT an eligible candidate for a lectotype. Thus, the situation of the absence of a suitable lectotype prevents one from restricting the type locality with any exactness.

Euchloe (Euchloe) *hyantis andrewsi* Martin

CITATION OF ORIGINAL DESCRIPTION: Martin, 1936. *Bull. So. Calif. Acad. Sci.* 35(2):94-95.

TYPE DATA: All of the type material was collected along the Crestline Highway, near Lake Arrowhead, San Bernardino Mountains, San Bernardino County, California between the elevations of 5000' and 6000' by R. H. Andrews on the dates June 14-19, 1935 and June 8-18, 1936. The holotype, allotype, and 37 paratypes are located in the Los Angeles County Museum, Los Angeles, California.

Euchloe (Euchloe) ausonides mayi Chermock & Chermock

CITATION OF ORIGINAL DESCRIPTION: Chermock & Chermock, 1940. *Can. Ent.* 72(4):81-83.

TYPE DATA: Holotype male, Riding Mountains, Manitoba, Canada, June 12, 1933, collected by Jack F. May. The specimen is in the collection of F.H. Chermock. The allotype female is located in the collection of the Carnegie Museum, Pittsburgh, Pennsylvania. The information of the accompanying labels of the allotype was noted for the author by H. K. Clench of the above institution: 1./"Riding Mountains/Manitoba VII-31-33" locality in letterpress, date handwritten, 2./"*Euchloe ausonides*/ var. *mayi*/ allotype / F. H. Chermock/ R. L. Chermock" the two authors names in script, the rest hand-lettered, all in black ink on a hand bordered pink card.

In the paper which included the original description the authors stated that 100 paratypes, all from the same locality but with various dates, were designated. Three paratypes are known to be located in the American Museum of Natural History, and one paratype is in the Carnegie Museum.

Euchloe (Euchloe) olympia (Edwards)

CITATION OF ORIGINAL DESCRIPTION: Edwards, 1871. *Trans. Ameri. Ent. Soc.* 3:266-277.

TYPE DATA: The holotype and allotype are located in the Carnegie Museum, Pittsburgh, Pennsylvania. The following information was provided through the courtesy of H.K. Clench of the Carnegie Museum. Each specimen bears the label: "Olympia ♂ [or ♀] / type Kan ". The word "type" is NOT in red ink.

INTERPRETATION OF TYPE DATA: The fact that the word "type" is not in red ink probably signifies that the word was placed on the labels at the time of the original description, and that these labels were NOT sent to Edwards by Holland at a much later date to have the word "type" appended in red ink (*vide* Clench, personal communication). The cryptic Kana refers to Kanawha according to Clench (personal communication), who states that "the name is born by a country, a river, and at least three communities or post offices have it as part of their name." Klots (1951) cites the type locality as Coalburgh, West Virginia. F. M. Brown (personal communication) states that Edwards lived in Coalburgh on the Kanawha River and often collected there. Hence, to be precise and in agreement with the data on the type label, the type locality should be stated as "banks of the Kanawha River, near Coalburgh, West Virginia."